

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI EXAMINATION – SUMMER 2025

Subject Code:3162009

Date:30-05-2025

Subject Name: Machine Vision

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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|------------|-----|---|-----------|
| Q.1 | (a) | Explain Match-Band effect in image processing. with graphical representation. | 03 |
| | (b) | Explain image formation in eye with graphical representation | 04 |
| | (c) | Describe various gray level transfer functions, which are useful in contrast stretching operation of digital image. Use graphical representation to support your answer | 07 |
| Q.2 | (a) | Justify the statement: Both the size and coefficients of smoothing filter are significant for blurring the digital image. | 03 |
| | (b) | Differentiate between 4-adjacency and 8-adjacency between pixels of digital image. | 04 |
| | (c) | Explain in brief different types of image sensors. | 07 |
| | | OR | |
| | (c) | Explain why the discrete histogram equalization technique does not, in general, yield a flat histogram. | 07 |
| Q.3 | (a) | Give the difference between point processing and mark processing. | 03 |
| | (b) | Evaluate the statement: “Gray level slicing does not always compress the digital image” | 04 |
| | (c) | What is the electromagnetic spectrum, and what types of waves does it include? | 07 |
| | | OR | |
| Q.3 | (a) | Differentiate between band pass and band reject filter with graphical representation. | 03 |
| | (b) | Draw and briefly describe ideal low pass filter. | 04 |
| | (c) | Derive Laplacian filter (size 3x3) in spatial domain. List out various applications which exhibit the use of Laplacian filter. | 07 |
| Q.4 | (a) | Scaling cannot be neglected when one digital image is subtracted from another. – Evaluate the statement. | 03 |
| | (b) | Explain the logical operations AND and OR, which are performed on a digital image. | 04 |
| | (c) | List out various sharpening filters. Describe the working principle of any one sharpening filter. | 07 |
| | | OR | |
| Q.4 | (a) | Briefly describe the digital image acquisition using sensor-strip. Give suitable examples of applications where this system of acquisition is used. | 03 |
| | (b) | Explain the Dilation process used to bridge the gap of broken characters for the application of character-recognition from the given text data | 04 |
| | (c) | Define histogram. Draw histograms of various digital images like bright, dark, poor contrast and high contrast. Bring out the significance of histogram equalization. | 07 |

- Q.5** (a) Explain the working principle of midpoint filter for eliminating the noise from the given image **03**
- (b) Briefly explain the working of alpha trimmed mean filter for the removal of noise from the image **04**
- (c) List out different redundancies of digital image. Explain any of them in detail. **07**
- OR**
- Q.5** (a) Differentiate between adaptive filters and regular filters. **03**
- (b) What is called edge enhancement? Describe the edge enhancement technique in spatial domain **04**
- (c) In arithmetic coding, why is the choice of probability model important for achieving efficient compression? **07**
